Econ 305: Behavioral Economics
Spring 2008

Problem Set #1

I hear, and I forget
I see, and I remember
I do, and I understand
-Chinese Proverb

Note: You **are** allowed to work in groups for problem sets. However, everyone must still submit their own write-up of the answers. In addition, if you collaborate, please indicate the fellow members of your group at the top of your answer sheet.

1) Suppose you must choose between the following gambles:
($1000, .5 ; 600, .25 ; 0 , .25) or ($1500, .6 ; -500 , .4)

a) What is the expected value of each gamble?

Suppose you are an Expected Utility maximizer and have initial wealth of $5000. Which gamble would you pick if your utility function is:
b) $U(x) = 2x$
c) $U(x) = x^{.85}$
d) $U(x) = \ln(x)$

2) Consider the following gamble: ($1050, .50 ; -1000, .50)
Suppose a decision maker has utility function $U(x) = x^{.70}$ Would an EU decision-maker accept this gamble with

a) wealth of $5,000
b) wealth of $50,000

3) Consider the following gamble: 50% chance of winning $1,000, 50% chance of losing $550:
($1000, .50 ; -550 , .50)
Suppose an agent has a prospect theory value function of:

$$u(x) = \begin{cases} x \text{ if } x \geq 0 \\ 2x \text{ if } x < 0 \end{cases}$$

For simplicity, ignore the probability weighting function; assume she just weighs probabilities linearly.

a) Suppose she must choose between playing the gamble once or not playing it. Which will she choose?

b) Now suppose the gamble will be played TWICE in a row. A single payment would be made at the end. Would she be willing to play this twice-repeated gamble? (Hint: First

figure out what the final probabilities and outcomes for the twice-repeated gamble would be.)

c) Are your answers to (a) and (b) different? Why or why not? What does this imply about how often you should check and see how your stock portfolio is doing?

4) Ben has a prospect theory value function of:

$$u(x) = \left\{ \begin{array}{c} x^{.75} \text{ if } x \geq 0 \\ -2(-x)^{.75} \text{ if } x < 0 \end{array} \right\}$$

Again, ignore the probability weighting function. Suppose that Ben has been losing at the poker tables, and has currently lost $1000.

a) If his reference point is the amount of money he walked into the casino with, what is his current utility?

b) Now suppose he is offered a "double or nothing" gamble of (1000, .50 ; -1000, .50). Using the same reference point as above, what is the expected utility of the gamble. Should he take the gamble?

c) How and why would your answer to (b) be different if he had been winning at the poker tables? (No calculations are necessary.)

5) The following is just to give you some experience with probability weighting functions. Consider the choice between the following two gambles: ($4000,.80) or ($3000).
Suppose Jerry has risk-neutral utility; that is, $u(x) = x$, but he has the following probability weighting function:

$$\pi(p) = \frac{p^{.60}}{(p^{.60} + (1-p)^{.60})^{1/.60}}$$

a) What is his expected utility, $\pi(p) * u(x)$, for each gamble? Which one does he choose?

b) Now suppose the two gambles are ($4000, .04) or ($3000, .05). Now which one does he choose?

6) Suppose Batman has the following reference-dependent utility function, defined over cars (c) and money (m): $u(c, m) = 3(c - r_c) + (m - r_m)$. That is, r_c and r_m denote his reference point for each commodity. However, for each individual component cars or money, he exhibits loss-aversion; that is, $v(x) = x$ if $x \geq 0$ and $2x$ if $x < 0$.

The cost of a Batmobile is $2. Batman currently has no cars and we can normalize his wealth to 0.

a) Suppose his reference point is to not buy a car ($r_c = 0; r_m = 0$), that is, he doesn't expect to buy a car. Should he buy a new Batmobile?

b) Now suppose his reference point is to buy a car ($r_c = 1; r_m = -2$), that is, he is expecting to buy a car. Should be buy a new Batmobile?

c) How does this relate to the endowment effect?